

Mr. Herb Lopato is one of the principals in Computer Horizons Corporation, a New York based, consulting and software company. With over ten years in the computer industry, he has extensive experience in the design, development and use of operating systems. Mr. Lopato has worked with medium and large scale computing systems in both batch and remote environments. In 1968 he joined Computer Horizons where, as Director of Technical Operations, Mr. Lopato heads an organization whose function it is to customize operating systems to specific client needs. He received a BA from the City College of New York.

REGISTRATION: Registration, including course materials and luncheons, is \$300 for the first participant, and \$275 for others from the same organization. Checks for registration should be made payable to The Institute for Advanced Technology. Classes will begin at 9:00 a.m. and end at 5:00 p.m. daily.

LOCATION: Seminars are conducted at the hotels listed below. The cost of hotel rooms is not included in the registration fee. IAT does not arrange hotel reservations; however, the hotels will hold a block of rooms for seminar participants until two weeks before the seminar. Hotel reservation cards will be forwarded with registration confirmations. Please contact the hotels directly for reservations, mentioning IAT, Control Data Corporation, the seminar, and dates attending.

May 17-19, 1971

The Barbizon-Plaza Hotel
106 Central Park South
New York, New York 10019

June 21-23, 1971

Sheraton-Silver Spring
8727 Colesville Road
Silver Spring, Maryland 20910

July 12-14, 1971

The Jack Tar Hotel
Van Ness & Geary Sts., Cathedral Hill
San Francisco, California 94101

August 9-11, 1971

Sheraton-Silver Spring
8727 Colesville Road
Silver Spring, Maryland 20910

The Sheraton-Silver Spring is a mile from the Capital Beltway, and is easily accessible to the entire metropolitan area and by direct limousine service to Washington airports. The hotel offers free parking to seminar participants.

OTHER SUBJECTS

- Advanced Programming Techniques
- Advanced EDP System Design Techniques
- Compiler Writing Techniques
- Computer Operations Management
- Computer Operations for Multiprogramming — Remote Job Entry — Time-Sharing Systems
- Data Base and File Organization
- Data Communications Systems
- Computer Graphics
- Design of Data Communications Systems
- EDP for the Banking Community
- Remote Computing
- Real-Time Systems
- Terminals in On-Line & Remote Computing Systems
- Facility Management — Promises & Pitfalls
- Management of Change in the Brokerage Industry

OTHER PROGRAMS: As an extension to the publicly offered program, The Institute for Advanced Technology offers seminars at the clients' premises or at special IAT facilities. The presentation of special sessions may be a replica of the regularly scheduled program, or may be specially tailored to meet clients' requirements.

For further information, or to be placed on the mailing list for future announcements, write:

REGISTRAR

The Institute for Advanced Technology

CONTROL DATA
CORPORATION

5272 River Road, Washington, D.C. 20016
Phone: Area Code 301/652-2268, Ext. 245

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The Institute for Advanced Technology

CONTROL DATA
CORPORATION

— presents —

OPERATING SYSTEMS



FOUR

3-DAY SEMINARS

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THE COURSE: One of the marked changes in the computer environment is the growing role of complex operating systems. Previously restricted to special systems or to a relatively few esoteric machines, operating systems are becoming part of the average computer installation. The modern operating system has impact on almost every part of the computer operation from programming to operations, from systems to design, to computer hardware configuration and evaluation. With this in mind, the user must understand the operating system in order to use his machine with greater effectiveness.

COURSE OBJECTIVE: This seminar is intended to provide the user with a knowledge of operating systems so that he may use them to maximum advantage.

WHO SHOULD ATTEND: This seminar will profit anyone who wishes to be up to date on what is happening in the computer field. It was specifically planned for data processing executives, systems analysts, programmers and systems programmers, and others requiring an understanding of the nature and significance of modern operating systems—what they are—what they do—and how to use them.

COURSE OUTLINE

- I. Introduction
- II. Background
- III. Functional Types Of Operating Systems
 - A. Batch of DOS
 - 1. Serial
 - 2. Job queueing
 - 3. Interface to drivers
 - 4. Interrupt handling
 - 5. Logical to physical IO mapping
 - B. Multiprogramming
 - 1. Multiple concurrent jobs
 - 2. Job scheduling
 - 3. Core allocation
 - 4. Relocation
 - 5. Resource allocation
 - 6. Improved run time diagnostics
 - 7. Memory protection
 - 8. System accounting
 - C. Time-Sharing
 - 1. Specialized scheduling
 - 2. Core utilization
 - 3. Interaction with running program
 - 4. Interaction with system
 - 5. Paging
 - 6. Combining time-sharing with a general purpose executive
 - D. Real Time Monitors
 - 1. Foreground/background
 - 2. Avoiding data loss

- E. Multiprocessing
 - 1. Master-slave
 - 2. Anonymous processor pool
- IV. Facilities And Features
 - A. Command Language
 - 1. Key user interface
 - 2. Ease of use
 - 3. Needed facilities
 - B. Check Point Restart
 - 1. Problems involved
 - 2. Program considerations
 - 3. File problems
 - C. Reliability
 - D. System Integrity
 - E. Memory Hierarchies
 - 1. Hardware management (370)
 - 2. Software management (6600)
 - 3. Mixed or hardware aided (360/67, B5500)
 - 4. Virtual memory concepts
 - E. Data Management
 - 1. File organization
 - 2. Multi-device
 - 3. Device independence
 - 4. Labels
 - 5. Catalogs and directories
 - G. Reentrance
 - 1. Definition
 - 2. Within the operating system
 - 3. In programs
 - H. Communicating with the Executive
 - 1. Directly (SVC)
 - 2. Indirectly
 - 3. Dynamic job stream generation
 - I. Operator Communication
 - 1. System messages
 - 2. Programmer provided
 - 3. Operator answers
 - J. Emulation and Simulation
 - 1. Definition
 - 2. Problems in IO
 - 3. Multiprogramming problems
- V. Hardware Considerations
 - A. Interrupt Structure
 - B. IO Structure
 - C. Memory Structure
 - D. Central Processor
 - E. Peripheral Pools
 - F. Random Access Considerations
- VI. Implications For The User
 - A. Overhead
 - 1. Core residence
 - 2. Executive time
 - 3. Bypassing

- B. Machine Room Staffing
 - 1. Console operator
 - 2. Scheduling
 - 3. Activity levels
 - 4. When it crashes
- C. Programming Implications
 - 1. Turnaround
 - 2. Programming and debugging time
 - 3. System interface problems
- D. Supporting the Operating System
 - 1. Selecting the system programmer
 - 2. Training
 - 3. Documenting problems
 - 4. Manufacturer support
- F. Should User Modify the Operating System?
 - 1. Fine tuning
 - 2. Packages
 - 3. Case studies
- F. Considerations in Developing a Special Operating System

The right to cancel the seminar or to amend the syllabus is reserved.

THE INSTRUCTORS:



Mr. Leonard A. Kreuter is Senior Partner of L. Kreuter Associates. From 1965 to 1967, he was employed by the Burroughs Corporation in the position of Sales Manager directing Large System Sales Managers throughout the country in marketing Burroughs large-scale computing equipment. In 1967, Mr. Kreuter joined C-E-I-R, Inc./Control Data Corporation as East-

ern Regional Manager of the New York C-E-I-R Center. From December 1967 to June 1968, he was Corporation Product Manager for the Burroughs Corporation. As one of the four planning managers, his prime responsibility was the development of a plan for Burroughs Corporation to enter on an international basis into the Time-Sharing Data Center Business. In June 1968, Mr. Kreuter became Chief Operating Officer of E.L.I. Computer Time-Sharing, Inc. In April 1970, Mr. Kreuter founded L. Kreuter Associates, a consulting firm directing its main thrust in the area of remote computation. He received a BA from City College of New York, and a MBA from Rutgers University.